

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1 - 36 (canceled)

37. (new): An electrically driven aircraft cabin ventilation and environmental control system comprising:

means for capturing ram air;

means for creating a first flow of said ram air and a second flow of said ram air;

electrically driven means for receiving said first flow of ram air and for creating a pressurized ram air flow;

first means for cooling said pressurized ram air flow, said first cooling means receiving said second ram air flow and using said second ram air flow as a heat sink;

second means for receiving said cooled pressurized ram air from said first cooling means and for cooling and removing moisture from said cooled pressurized ram air;

said second means including a reheater heat exchanger for cooling said cooled pressurized ram air from said first cooling means and a condenser heat exchanger for condensing water vapor contained in said cooled pressurized ram air and for further cooling said cooled pressurized ram air;

liquid from said condensed water vapor being separated in said condenser heat exchanger and being used to cool said second ram air flow prior to its use as a heat sink;

said air exiting said condenser being delivered to an opposite side of said reheater heat exchanger to be warmed;

expansion means for receiving said cooled ram air from said opposite side of said reheater heat exchanger and for expanding said cooled ram air; and

means for delivering said cooled pressurized air from said expansion means to said cabin, said delivering means comprising means for passing air exiting said expansion means through said condenser prior to delivering said air to said cabin.

38. (new): A system according to claim 37, wherein said electrically driven means comprises a ventilation compressor driven by an electric motor, and wherein said compressor and said motor are mounted to a common shaft.

39. (new): An electrically driven aircraft cabin ventilation and environmental control system comprising:

means for capturing ram air;

means for creating a first flow of said ram air and a second flow of said ram air;

electrically driven means for receiving said first flow of ram air and for creating a pressurized ram air flow;

first means for cooling said pressurized ram air flow, said first cooling means receiving said second ram air flow and using said second ram air flow as a heat sink;

second means for receiving said cooled pressurized ram air from said first cooling means and for cooling and removing moisture from said cooled pressurized ram air;

expansion means for receiving said cooled ram air from said second means and for expanding said cooled ram air;

means for delivering said cooled pressurized air from said expansion means to said cabin;
and

means for precooling said second ram air flow prior to said second ram air flow being delivered to said first cooling means.

40. (new): A system according to claim 37, wherein said expansion means comprises a cooling turbine to reduce the pressure and temperature of the warmed air exiting said reheater heat exchanger.

41. (new): A system according to claim 40, further comprising means for mixing engine bypass air with air exiting said cooling turbine.

42. (new): A system according to claim 40, wherein said electrically driven means, an electric motor for driving said electrically driven means, and said cooling turbine are mounted on a common shaft.

43. (new): A system according to claim 40, wherein said electrically driven means and an electric motor for driving the electrically driven means are mounted on a first shaft and said cooling turbine is mounted on a second shaft separate from said first shaft.

44. (new): A system according to claim 43, further comprising an electrical generator mounted to said second shaft and a power conversion unit connecting said electrical generator and said electrical motor.

45. (new): A system according to claim 37, wherein said delivering means comprises a mix manifold for receiving an exit air stream from said expansion means and for delivering air to said cabin.

46. (new): A system according to claim 45, wherein said mix manifold receives at least one of recirculated air from said cabin, a portion of said pressurized ram air prior to said compressed air entering said first cooling means, and hot gas bypass air from an engine.

47. (new): A system according to claim 46, further comprising means for exhausting a portion of cabin exhaust air to ambient.

48. (new): A system according to claim 46, further comprising a recovery heat exchanger for receiving said air exiting said electrically driven means and means for delivering cabin exhaust air to said recovery heat exchanger to act as a heat sink.

49. (new): A system according to claim 48, further comprising said electrically driven means, an electric motor for driving said electrically driven means and a condensing turbine being mounted to a common shaft, said second cooling means including a condenser heat exchanger, and said condensing turbine receiving cool dehumidified air exiting said condenser heat exchanger and further expanding the air so that said air exits said condensing turbine close to a desired cabin pressure level.

50. (new): An electrically driven aircraft cabin ventilation and environmental control system comprising:

means for capturing ram air;

means for creating a first flow of said ram air and a second flow of said ram air;

electrically driven means for receiving said first flow of ram air and for creating a pressurized ram air flow;

first means for cooling said pressurized ram air flow, said first cooling means receiving said second ram air flow and using said second ram air flow as a heat sink;

second means for receiving said cooled pressurized ram air from said first cooling means and for cooling and removing moisture from said cooled pressurized ram air;

expansion means for receiving said cooled ram air from said second means and for expanding said cooled ram air;

means for delivering said cooled pressurized air from said expansion means to said cabin;
and

means for removing a portion of the pressurized air exiting said electrically driven means upstream of said first cooling means to provide temperature modulation in an air cycle subsystem and air distribution system.

51. (new): An electrically driven aircraft cabin ventilation and environmental control system comprising:

means for capturing ram air;

means for creating a first flow of said ram air and a second flow of said ram air;

electrically driven means for receiving said first flow of ram air and for creating a pressurized ram air flow;

first means for cooling said pressurized ram air flow, said first cooling means receiving said second ram air flow and using said second ram air flow as a heat sink;

second means for receiving said cooled pressurized ram air from said first cooling means and for cooling and removing moisture from said cooled pressurized ram air;

expansion means for receiving said cooled ram air from said second means and for expanding said cooled ram air;

means for delivering said cooled pressurized air from said expansion means to said cabin;
and

a spray cooler for cooling said second ram air flow prior to delivering said second ram air flow to said first cooling means and means for delivering water to said spray cooler from said second cooling means.

52. (new): A method for delivering conditioned air to an aircraft cabin comprising the steps of:

capturing ram air;

creating a first flow of ram air and a second flow of ram air from said captured ram air;

delivering said first flow of ram air to an electrically driven compressor and pressurizing said ram air in said compressor;

providing first means for cooling said pressurized ram air;

delivering said second ram air flow to said first cooling means and using said second ram air flow as a heat sink;

providing second means for cooling said pressurized ram air and for removing moisture from said pressurized ram air;

delivering said cooled pressurized ram air from said first cooling means to said second cooling means;

removing moisture from said cooled pressurized ram air in said second means by condensing said moisture out of said cooled pressurized ram air and separating a liquid formed by said condensed moisture;

using said separated liquid to cool said second flow of ram air prior to its delivery to said first cooling means;

providing expansion means and delivering said cooled ram air from said second cooling and moisture removing means to an inlet of said expansion means; and

delivering said cooled pressurized air from an outlet of said expansion means to said cabin.

53. (new): A method according to claim 52, wherein said second cooling and moisture removing means providing step comprises providing a reheater heat exchanger and a condenser and said step of delivering said cooled ram air from said first cooling means comprises cooling said ram air by passing said ram air through said reheater heat exchanger and said condenser.

54. (new): A method according to claim 53, further comprising warming said air exiting said condenser by passing said air through said reheater heat exchanger.

55. (new): A method according to claim 54, wherein said expansion means comprises a cooling turbine and wherein said method further comprises introducing said warmed air exiting said reheater heat exchanger into an inlet of said cooling turbine, and expanding said air introduced into said cooling turbine inlet.

56. (new): A method according to claim 55, wherein said delivering step comprises introducing said expanded air exiting said cooling turbine into said condenser and delivering said expanded air in a cooled condition to a cabin air distribution system mix manifold.

57. (new): A method according to claim 56, further comprising providing a condenser turbine and passing said air stream exiting said condenser through said condense turbine prior to said delivering step.

58. (new): A method according to claim 55, further comprising mounting said compressor and an electric motor for driving said compressor on a first shaft, mounting said cooling turbine and an electric generator on a second shaft separate from said first shaft, and transmitting energy flow by providing an electric link between said electric motor and said electric generator.